

3.8

## 3.1 The Law of Sines

ver

64 pts.

Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

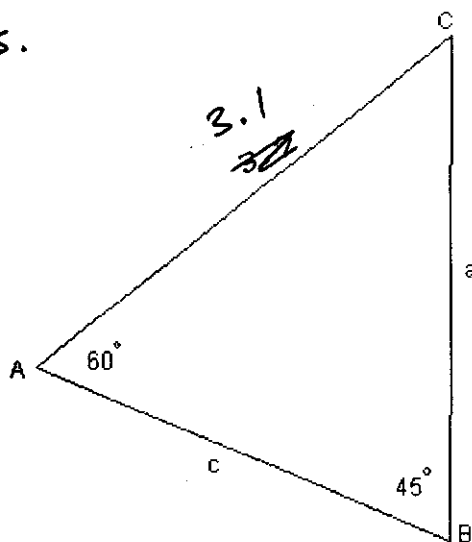
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the triangle. Show work!

1)

1) \_\_\_\_\_

3 pts.



$$\angle C = 75^\circ$$

$$c \approx 4.2$$

$$a \approx 3.8$$

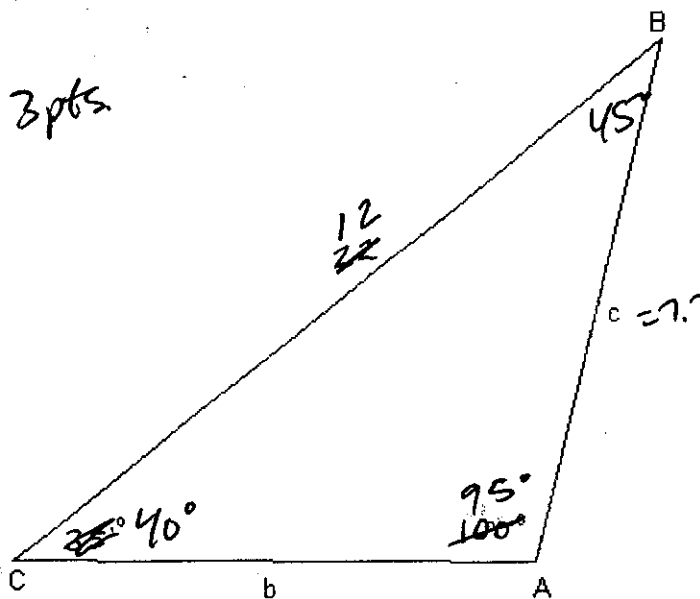
$$\frac{\sin 45^\circ}{3.1} = \frac{\sin 75^\circ}{c}$$

$$\frac{\sin 60^\circ}{a} = \frac{\sin 45^\circ}{3.1}$$

2)

2) \_\_\_\_\_

3 pts.



$$\angle B = 45^\circ$$

$$b \approx 8.5$$

$$c \approx 7.7$$

$$\frac{\sin 95^\circ}{12} = \frac{\sin 40^\circ}{c}$$

$$c = 7.7$$

$$\frac{\sin 45^\circ}{b} = \frac{\sin 95^\circ}{12}$$

3) A = 40°, B = 30°, b = 10

3) \_\_\_\_\_

$$3 \text{ pts } \angle C = 110^\circ, a \approx 12.9, c \approx 18.8$$

3 4)  $A = 33^\circ, B = 70^\circ, b = 7$

$C = 77^\circ, a \approx 4.1, c \approx 7.3$

4) \_\_\_\_\_

3 5)  $A = 32^\circ, a = 17, b = 11$

$B \approx 20.1^\circ, C \approx 127.9^\circ, c \approx 25.3$

5) \_\_\_\_\_

3 6)  $B = 70^\circ, b = 14, c = 9$

$C \approx 37.2^\circ, A \approx 72.8^\circ, a \approx 14.2$

6) \_\_\_\_\_

State whether the given measurements determine zero, one, or two triangles. Show work!

1 7)  $A = 36^\circ, a = 2, b = 7$

7) Zero

1 8)  $C = 36^\circ, a = 17, c = 16$

8) two

1 9)  $C = 30^\circ, a = 18, c = 9$

9) one  
~~many~~

1 10)  $B = 82^\circ, b = 17, c = 15$

10) one

Two triangles can be formed using the given measurements. Solve both triangles. Show work!

6 11)  $A = 64^\circ, a = 16, b = 17$

$B_1 \approx 72.7^\circ, C_1 \approx 43.3^\circ, c_1 \approx 12.2$

$B_2 \approx 107.3^\circ, C_2 \approx 8.7^\circ, c_2 \approx 2.7$

11) \_\_\_\_\_

6 12)  $C = 68^\circ, a = 19, c = 18$

$A_1 \approx 78.2^\circ, B_1 \approx 33.8^\circ, b_1 \approx 10.8$

$A_2 \approx 101.8^\circ, B_2 \approx 10.2^\circ, b_2 \approx 3.4$

12) \_\_\_\_\_

Determine the values of  $b$  that will produce the given number of triangles if  $a = 10$  and  $B = 42^\circ$ . Show work!

2 13) a) two triangles

$$6.691 < b < 10$$

$$a \cdot \sin B$$

$$10 \cdot \sin 42^\circ = 6.691$$

13) \_\_\_\_\_

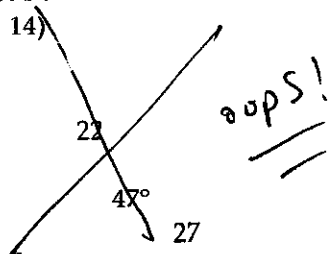
2 b) one triangle

$$b \approx 6.691 \text{ or } b \geq 10$$

1 c) zero triangles

$$b < 6.691$$

The given measurements may or may not determine a triangle. If not, then state that no triangle is formed. If a triangle is formed, then use the Law of Sines to solve the triangle, if it is possible, or state that the Law of Sines cannot be used. Show work!



14) \_\_\_\_\_

2 15)  $A = 61^\circ$ ,  $a = 8$ ,  $b = 21$

$$21 \sin 61^\circ = 18.36$$

$$8 < 18.36$$

15) no triangle  
can be formed

2 16)  $A = 136^\circ$ ,  $a = 15$ ,  $b = 28$

$$28 \cdot \sin 136^\circ = 19.45$$

$$15 < 19.45$$

16) no triangle  
is formed

3 17)  $B = 42^\circ$ ,  $c = 18$ ,  $C = 39^\circ$

$$A = 99^\circ, a \approx 28.3, b \approx 19.1$$

17) \_\_\_\_\_

6 18)  $C = 75^\circ$ ,  $b = 49$ ,  $c = 48$

$$A_1 = 24.6^\circ, B_1 = 80.4^\circ, a_1 = 20.7$$

$$A_2 = 5.4^\circ, B_2 = 99.6^\circ, a_2 = 4.7$$

18) \_\_\_\_\_

1 19)  $B = 31^\circ$ ,  $a = 8$ ,  $c = 11$

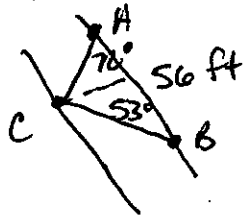
19) Cannot be  
solved using  
Law of Sines  
(SSS case)

Solve. Show work!

- 20) Two markers A and B on the same side of a canyon rim are 56 ft. apart. A third marker C, located across the rim, is positioned so that angle  $BAC = 72^\circ$  and angle  $ABC = 53^\circ$ .

20) \_\_\_\_\_

- 2 a) Find the distance between C and A.



$$\angle C = 55^\circ$$

$$c = 54.6 \text{ ft}$$

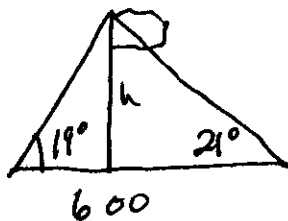
- b) Find the distance between the two canyon rims. (Assume they are parallel.)

2

$$51.9 \text{ ft.}$$

- 21) Two observers are 600 ft. apart on opposite sides of a flagpole. The angles of elevation from the observers to the top of the pole are  $19^\circ$  and  $21^\circ$ . Find the height of the flagpole.

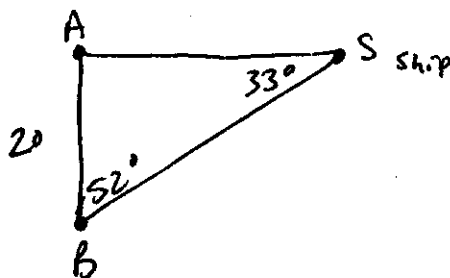
21) \_\_\_\_\_



$$h = 108.9 \text{ ft}$$

- 22) Two lighthouses A and B are known to be exactly 20 miles apart on a north-south line. A ship's captain at S measures angle ASB to be  $33^\circ$ . A radio operator at B measures angle ABS to be  $52^\circ$ . Find the distance from the ship to each lighthouse.

22) \_\_\_\_\_



$$AS = 36.6 \text{ mi}$$

$$BS = 28.9 \text{ mi}$$